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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/039,942	01/03/2002	Bruce W. Lee	H0003369 (4960)	8444

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EXAMINER

SEMENENKO, YURIY

ART UNIT PAPER NUMBER

2841

DATE MAILED: 07/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/039,942

Applicant(s)

LEE ET AL.

Examiner

Yuriy Semenenko

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on 27 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 12-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11 and 19-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

1.1. Amendment filed on 4/27/2005 has been entered.

In response to the Office Action dated March 10, 2005, Applicants have amended claims 1, 5 and 9.

Claim 10 has been cancelled. Claims 12-25 are newly added.

Claims 1-25 are now pending in the application.

1.2. Applicant must withdraw new claims 12-18 drawn to a method for reason discussed in Office Action filed 3/10/2005.

### ***Drawings***

2. The Drawings corrections, filed on 4/27/2005 are considered and is acknowledged.

### ***Specification***

3. The Specification amendments, filed on 4/27/2005 are considered and is acknowledged.

3.1. The abstract of the disclosure is objected to because the sentence "A method of filling holes in substrate...." (line 8) is not succinct. Subject of this application is an assembly (product), not a method of making assembly. Correction is still required. See MPEP § 608.01(b).

***Claims***

- 4.1. Informalities correction Claims 1 and 5 filed on 4/27/2005 are considered and is acknowledged.
- 4.2. Claims 1 and 9 amendments, filed on 4/27/2005 are considered and is acknowledged.

***Response to Arguments***

- 5.1. Applicant's arguments with respect to amended independent claims 1, 9 are considered and acknowledged but are moot in view of the new grounds of rejection (see below).
- 5.2. Applicant's arguments with respect to dependent claims 2-8, 11 are considered and acknowledged but they are not persuasive as based on arguments with respect to independent claims 1, 9.

***Claim Rejections - 35 USC § 103***

- 6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

***Claim Rejections - 35 USC § 103***

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6.1. Claims 1-8 are rejected under U.S.C. 103(a) as being obvious over S. Kawakami et al. (Patent #5191709) hereafter Kawakami in view of Biunno et al.

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(Patent # 6282782) hereafter Biunno in further view of G. Johansson et al. (Patent # 6090474) hereinafter Johansson.

6.1.1. Regarding claim 1: Kawakami discloses assembly Fig. 1 includes hole-fill stand-off 10, a tooling plate 9, contacting the hole-fill stand-off, the stand-off and tooling plate is aligned to each other. A device 30 (Fig. 2) having holes 34 and 35 to be filled removably contacting the stand-off 48. The stand-off and device are aligned to each other. The device 30 and stand-off 48 each having at least one hole 50 and 34 respectively. The hole 34 of the device 30 is aligned with the hole 50 of the stand-off 48 (column 6, line 34-36),

except Kawakami doesn't explicitly teach the etched hole-fill stand-off comprises layers wherein the at least one hole of the stand-off is etched through the first layer but not through either the dielectric layer or second layer.

Biunno discloses in Fig. 5 an etched hole-fill stand-off 318, wherein the etched hole-fill stand-off comprises layers wherein the at least one hole 340 of the stand-off is etched through the first layer 320 but not through either the dielectric layer (column 8, lines 24-25) or second layer 344. Therefore, at the time the invention was made, it was well known to use the etched hole-fill stand-off comprises layers wherein the at least one hole of the stand-off is etched through the first layer but not through either the dielectric layer or second layer.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for Kawakami to include in his invention the etched hole-fill stand-off comprises layers wherein the at least one hole of the stand-off is etched through the first layer but not through either the dielectric layer or second layer.

Benefit of doing so is to provide inexpensive method of making precision holes.

Kawakami also fail to disclose that layer 324 is laminated between layers 344 and 320, and layers 344 and 320 are copper layers.

Johansson teaches layer laminated between copper two layers (column 13, lines 4-15). This reference is recited only as one example of well known methods. Therefore, at

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the time the invention was made, it was well known laminating and etching processes for manufacturing dielectric layer laminated between copper layers.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for Kawakami to include in his invention dielectric layer laminated between copper layers.

Benefit of doing so is to provide more durable fixture - stand-off.

6.1.2. Regarding claim 2: And further, Kawakami as modified teaches the assembly of claim 1, wherein the hole 11 (Fig. 1), of stand-off 10 is larger in diameter than the hole 5 of the device 1, as recited Kawakami (column 4, line 19-21)

6.1.3. Regarding claim 3: Kawakami as modified teaches the assembly of claim 1, wherein the device 30 comprises a plurality of holes 34,35 to be filled and stand-off 48 comprises a plurality of holes 50, 51. The each holes to be filled of the device 30 is aligned with a hole of the stand-off 48 (column 6, lines 34-36).

6.1.4. Regarding claim 4: Kawakami teaches the assembly (Fig. 1) as discussed above with respect to claim 1 comprising stand-off and device and the layer of the stand-off being in direct contact with the layer of the device,

except Kawakami does not necessarily teach that stand-off 10 comprises an external copper layer and the device comprises an external copper layer.

Johansson teaches the device comprises an external copper layers (column 13, lines 4-15). Therefore, at time the invention was made, it was well known to use copper as external layer for printed wiring board (PWB).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Kawakami to include in his invention that the stand-off comprises an external copper layer and the device comprises an external copper layer, the layer of the stand-off being in direct contact with the layer of the device to provide good support a substrate during filling.

6.1.5. Regarding claim 8: Kawakami discloses as shown on Fig. 2, at least one hole 35 of the device 30 is filled with a fill material 8 that extends partially into a hole of the stand-off 48 without contacting the stand-off.

6.1.6. Regarding claim 5: Kawakami as modified, disclosed the assembly (Fig. 1) having all of the claimed features as discussed above with respect claim 1,

except Kawakami does not necessarily the at least one hole of the stand-off extends only through the external copper layer of the stand-off.

Biunno teaches in Fig. 5 the at least one hole 340 of the stand-off 318 extends only through the external copper layer 320 of the stand-off. Therefore, at time the invention was made, it was well know to use the at least one hole of the stand-off extends only through the external copper layer of the stand-off.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Kawakami to includes in his invention the at least one hole of the stand-off extends only through the external copper layer of the stand-off.

Benefit of doing so is to provide space for filling materials.

6.1.7. Regarding claim 6: Kawakami as modified, disclosed the assembly having all of the claimed features as discussed above with respect claim 1,

except Kawakami does not necessarily teach a first set of pins aligns the stand-off to the tooling plate and a second set of pins aligns the printed wiring board to the stand-off.

Biunno teaches in Fig. 5 a first set of pins aligns the stand-off to the tooling plate (column 8, lines 26-40) and a second set of pins 328 aligns the printed wiring board 300 to the stand-off 318. Therefore, at time the invention was made, it was well know to use a first set of pins aligns the stand-off to the tooling plate and a second set of pins aligns the printed wiring board to the stand-off.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Kawakami to includes in his invention a first set of pins



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aligns the stand-off to the tooling plate and a second set of pins aligns the printed wiring board to the stand-off.

Benefit of doing so is to provide precision of lay-out of the holes on layer.

6.1.8. Regarding claim 7: Kawakami as modified, disclosed the assembly having all of the claimed features as discussed above with respect claim 6,

except Kawakami does not explicitly teach the stand-off rests on but is not bonded to the tooling-plate other than by the pins aligning the stand-off and the tooling plate, and the device rests on but is not bonded to the stand-off other than by the pins aligning the stand-off and the printed wiring board.

Biunno disclosed in Fig. 5 the stand-off rests on but is not bonded to the tooling-plate other than by the pins aligning the stand-off and the tooling plate (column 8, lines 26-40), and the printed wiring board 300 rests on but is not bonded to the stand-off 318 other than by the pins 328 aligning the stand-off and the printed wiring board. Therefore, at time the invention was made, it was well know to use the stand-off rests on but is not bonded to the tooling-plate other than by the pins aligning the stand-off and the tooling plate, and the device rests on but is not bonded to the stand-off other than by the pins aligning the stand-off and the printed wiring board.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Kawakami to includes in his invention the stand-off rests on but is not bonded to the tooling-plate other than by the pins aligning the stand-off and the tooling plate, and the device rests on but is not bonded to the stand-off other than by the pins aligning the stand-off and the printed wiring board.

Benefit of doing so is to easy to operate with stand-off.

6.2. Claims 9, 11, 19-24 are rejected under 35U.S.C. 103(a) as being obvious over Biunno in view of Johansson.

6.2.1. Regarding claim 19: Biunno discloses in Fig. 5 an etched hole-fill stand-off 318 to support a printed wiring board 300, comprising: a non-etched layer 344; an etched (column 8, lines 6-7) layer 320 having a plurality of etchings holes 340, wherein at least

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on etching hole of the plurality of etchings holes is aligned with a hole 312 of the printed wiring board 300, and a dielectric (column 8, lines 24-25) layer 324 between the non-etched layer 344 and the etched layer 320.

However, Biunno doesn't teach that layer 324 laminated between layers 344 and 320; and layers 344 and 320 are copper layers.

Johansson teaches layer laminated between copper two layers (column 13, lines 4-15). This reference is recited only as one example of well known methods. Therefore, at the time the invention was made, it was well known laminating and etching processes for manufacturing dielectric layer laminated between copper layers.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for Biunno to include in his invention dielectric layer laminated between copper layers.

Benefit of doing so is to provide more durable fixture - stand-off.

6.2.2. Regarding claim 20: Biunno disclosed in Fig. 5 the etched hole-fill stand-off having all of the claimed features as discussed above with respect claim 19 and further wherein the at least one etching 340 is larger in than the hole 312 of the printed wiring board.

6.2.3. Regarding claim 21: Biunno disclosed the etched hole-fill stand-off having all of the claimed features as discussed above with respect claim 19 wherein the printed wiring board comprises a plurality of holes to be filled (column 5, lines 59-61), wherein each hole to be filled of the printed wiring board is aligned with an etching of the plurality of etchings of the stand-off (column 7, lines 50-52).

6.2.4. Regarding claim 22: And further, Biunno, as modified, disclosed in Fig. 5 the etched hole-fill stand-off having all of the claimed features as discussed above with respect claim 21, wherein the at least one hole 340 of the stand-off 318 extends only through the external copper layer 320 of the stand-off.

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6.2.5. Regarding claim 23: Biunno as modified, disclosed in Fig. 5 the etched hole-fill stand-off 318 having all of the claimed features as discussed above with respect claim 19, wherein a first set of pins aligns the stand-off to the tooling plate (column 8, lines 26-40) and a second set of pins 328 aligns the printed wiring board to the stand-off

6.2.6. Regarding claim 24: Biunno as modified, disclosed in Fig. 5 the etched hole-fill stand-off 318 having all of the claimed features as discussed above with respect claim 22, wherein the stand-off rests on but is not bonded to the tooling-plate other than by the pins aligning the stand-off and the tooling plate (column 8, lines 26-40), and the printed wiring board 300 rests on but is not bonded to the stand-off 318 other than by the pins 328 aligning the stand-off and the printed wiring board.

6.2.7. Regarding claim 9: And further, Biunno as modified, disclosed in Fig. 5 an assembly comprising an etched hole-fill stand-off, the stand-off comprising an etched layer bonded to a non-etched layer; wherein the etched hole-fill stand-off comprises a copper clad laminate having a dielectric layer laminated between a first and a second copper layer wherein the at least one hole of the stand-off is etched through the first copper layer but not through either the dielectric layer or second copper layer, as discussed above with respect claim 19.

6.2.8. Regarding claim 11: And furthermore, Biunno disclosed in Fig. 5 the etched hole-fill stand-off 318 having all of the claimed features as discussed above with respect claim 9, further comprising: a tooling plate 344, contacting the non-etched layer of the etched hole-fill stand-off 324, the stand-off and tooling plate are aligned to each other (column 8, lines 35-40). A device 300 having holes 312 to be filled removably contacting the etched layer of the stand-off 320, the stand-off and device are aligned to each other 328. The device and stand-off each having at least one hole 312 and 340 respectively. The hole 312 of the device 300 is aligned with the hole 340 of the stand-off 318. The hole of the stand-off having a larger diameter than the hole of the device.

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6.3. Claims 11, 25 are rejected under 35U.S.C. 103(a) as being obvious over Biunno in view of Johansson and further view of Kawakami.

6.3.1. Regarding claim 25: Biunno disclosed in Fig. 5 the etched hole-fill stand-off 318 having all of the claimed features as discussed above with respect claim 19.

However, Biunno doesn't teach at least one hole of the printed wiring board is filled with a fill material that extends partially into an etching of the stand-off without contacting the stand-off.

Kawakami teaches as shown on Fig. 2 at least one hole 35 of the printed wiring board 30 is filled with a fill material 8 that extends partially into an etching of the stand-off 48 without contacting the stand-off. Therefore, at the time the invention was made, it was well known how to fill at least one hole of the printed wiring board with a fill material that extends partially into an etching of the stand-off without contacting the stand-off.

Therefore it would have been obvious to one of ordinary skill in the art, at the time the invention was made for Biunno to include in his invention that at least one hole of the printed wiring board is filled with a fill material that extends partially into an etching of the stand-off without contacting the stand-off.

Benefit of doing so is to prevent short connection of the printed wiring board.

### ***Relevant Art***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

7.1. The reference to D. Hembree (Patent #2003/02155680 hereinafter Hembree). Hembree discloses in Fig. 1 A silicon wafer (10) mounted on a substrate (12), has a through-hole (11). A solder jet nozzle (13) is arranged in line with hole, such that the molten material balls (26) ejected from nozzle, enters into hole of the silicon wafer

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7.2. The reference to R. Arldt et al. (Patent #6134772) hereinafter Arldt.

Atldt discloses invention permits solder joints to be made directly to via and through holes without the solder being wicked into the vias or through holes, by filling plated through holes with an epoxy or cyanate fill composition. The invention also relates to several novel methods for filling through holes with such fill compositions, and to resistors located in through holes and vias.

### *Conclusion*

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


9.1. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yuriy Semenenko whose telephone number is (571) 272-6106. The examiner can normally be reached on 8:30am - 5:00pm.

9.2. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571)- 272-1957. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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9.3. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

YS



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